

भारतीय मानक
सम्मिश्र तले के स्टेनलेस इस्पात के
पकाने के बर्तन — विशिष्टि

Indian Standard
**COMPOSITE BOTTOM STAINLESS STEEL COOKING
UTENSILS — SPECIFICATION**

ICS 97.040.50

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Utensils, Cutlery and Domestic Hardware Sectional Committee had been approved by the Mechanical Engineering Division Council.

The requirements of composite bottom stainless steel cooking utensils were covered in three parts of IS 4536 'Composite bottom stainless steel cooking utensils: Part 1 Copper electro-deposited, Part 2 3-ply construction, Part 3 Copper clad'.

The committee decided to amalgamate these standards and bring out one single standard after incorporating amendments for the convenience of all the stake holders. Accordingly this standard has been formulated and it will supersede IS 4536 (Parts 1 to 3).

These utensils have a combination of one or two better heat conducting metals than stainless steel for increasing the thermal conductivity uniformly all over the area. This standard covers the requirements of copper electro-deposited and composite bottom (clad) stainless steel cooking utensils. Composite bottom stainless steel cooking utensils of 3-Ply construction is designed to provide all the advantages of durability, cleanliness, corrosion resistance and sanitation offered by stainless steel with addition of the superior heat conductivity of copper or aluminum.

In this standard following changes have been made:

- a) Incorporation of dry heat test; and
- b) Modification in mechanical shock test.

The shapes and sizes demanded in the country differ from area to area and therefore, need not rigidly be tied down. For the general uses, the shapes and sizes covered in this standard are recommended.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***COMPOSITE BOTTOM STAINLESS STEEL COOKING
UTENSILS — SPECIFICATION****1 SCOPE**

This standard covers requirements of composite bottom stainless steel cooking utensils (copper electro-deposited, copper or aluminium clad 2-ply and 3-ply composite bottom).

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
21 : 1992	Wrought aluminium and aluminium alloys for manufacture of utensils — Specification (<i>fourth revision</i>)
191 : 2007	Copper — Specification (<i>fourth revision</i>)
5522 : 1992	Stainless steel sheets and strips for utensils — Specification (<i>second revision</i>)
6527 : 1995	Stainless steel wire rods — Specification (<i>first revision</i>)
6911 : 1992	Stainless steel plate, sheet and strip — Specification (<i>first revision</i>)
9040 : 1978	Method for sampling of utensils
13395 : 1995	Performance of handles and handle assemblies attached to cookware — Specification
14811 : 2000	Rolled copper plate, sheet, strip and foils for general engineering purposes — Specification

3 MATERIAL

3.1 The material used for the manufacture of utensils shall conform to designation X07Cr18Ni9 or X04Cr19Ni9 of IS 5522 or IS 6911.

3.1.1 The materials used for electro-deposition on bottom shall be as given in **3.1.1.1** and the materials used for cladding 2-ply shall be either as specified in **3.1.1.2** or **3.1.1.3**.

3.1.1.1 The material used for the deposition on the

bottom of the utensil shall be electrolytic copper conforming to IS 191.

3.1.1.2 Copper used for cladding shall conform to IS 14811.

3.1.1.3 Aluminium used for cladding shall conform to IS 21.

3.1.2 In case of 3-ply construction, the protector plate material shall conform to IS 6911. The material for the core shall be either as specified in **3.1.2.1** or **3.1.2.2**.

3.1.2.1 Copper used for core shall conform to IS 14811.

3.1.2.2 Aluminium used for core shall conform to IS 21.

3.2 Rivets, legs and other fittings used on the body of the utensils shall be made of the stainless steel conforming to IS 6911 or IS 6527 or aluminium conforming to IS 21.

3.3 The screws used to screwing handle with the body shall be made of either stainless with nickel chromium or steel conforming to IS 6527 or brass plate any other non-corrosive material suitably plated.

3.4 The handle and knob shall conform to IS 13395.

3.5 The knobs for the lids shall be made of corrosion resisting material or non-ferrous material suitably plated or made from impact resistant and heat resistant plastics.

4 MATERIAL THICKNESS

4.1 In case of two ply construction at the bottom of the utensil, the minimum thickness of the cladding material shall be as given in Table 1.

Table 1 Cladding Material Thickness

All dimensions in millimetres.

Sl No.	Diameter of Cladding Disc	Thickness of Copper Disc	Thickness of Aluminium Disc
(1)	(2)	(3)	(4)
i)	Up to 150	1.5	2.5
ii)	Above 150 to 200	1.8	3.0
iii)	Above 200	2.4	3.5

4.2 In case of electro-deposition of copper, the minimum thickness of copper layer shall be 0.5 mm.

4.3 In case of 3-ply composite bottom stainless steel cooking utensils, the protective stainless steel layer shall not have a nominal thickness less than 0.5 mm and minimum thickness of the sandwiched core shall be as given in Table 2.

Table 2 Core Thickness for 3-ply Construction

All dimensions in millimetres.

Sl No.	Diameter of Cladding Disc	Minimum Thickness of Copper Disc	Minimum Thickness of Aluminium Disc
(1)	(2)	(3)	(4)
i)	Up to 150	1.5	2.5
ii)	Above 150 to 200	1.8	3.0
iii)	Above 200	2.4	3.5

5 DIMENSIONS OF UTENSIL

5.1 Popular shapes and dimensions of utensils are given in Fig. 1 to Fig. 4, however these utensils may also be supplied conforming to other dimensions/shapes as agreed to between the purchaser and the manufacturer. The nominal thickness of the body shall not be less than that is given in Table 3.

Table 3 Body Thickness (Utensils Only)

All dimensions in millimetres.

Sl No.	Dimension of Utensil		
	Internal Base	External Height	Thickness of Body
i)	Up to 300	Up to 175	0.5
ii)	Up to 300	Above 175 to 500	0.7
iii)	Above 300 to 500	Up to 500	0.7

5.2 Tolerances applicable to various sizes of the utensils shall be as specified in Table 4.

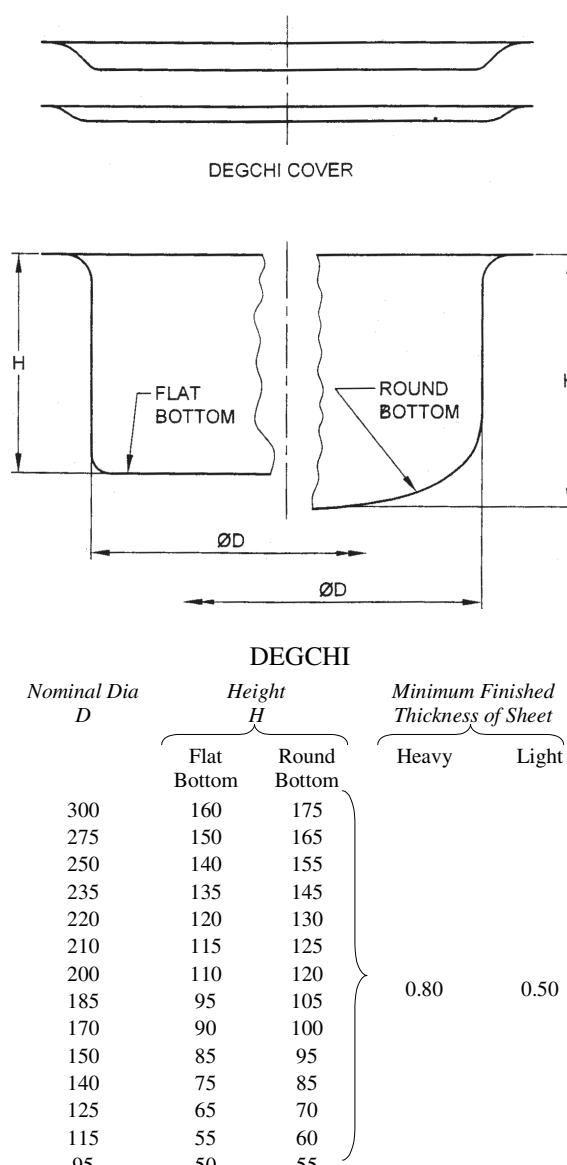
Table 4 Tolerances

All dimensions in millimetres.

Sl No.	Dimension	Tolerance on Height
(1)	(2)	(3)
i)	Up to 50	± 1
ii)	Above 50 to 100	± 2
iii)	Above 100 to 200	± 3
iv)	Above 200	± 5

6 WORKMANSHIP

6.1 The utensils shall have no sharp edges and shall be free from wrinkles, scratches, dents and other surface defects. In case of electrolytic copper deposition on the utensil at the bottom, the coating shall be free from defects such as pits, stains, blisters, unplated areas and other superficial blemishes visible to the naked eye.



All dimensions in millimetres.

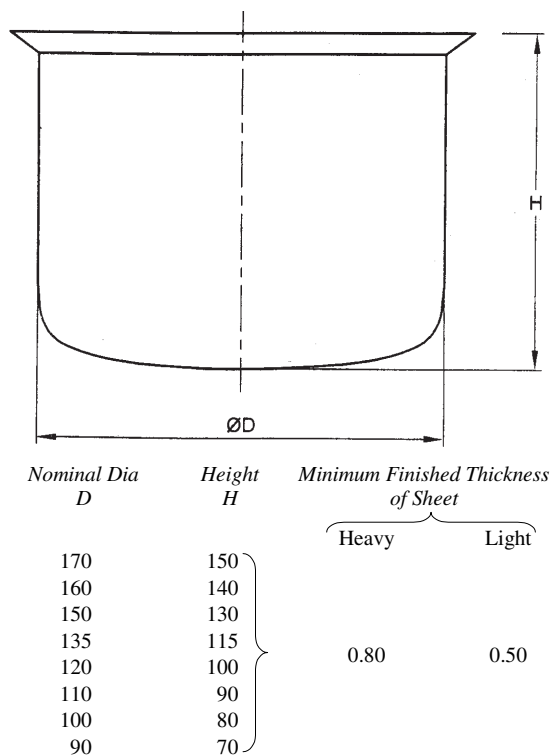
FIG. 1 DEGCHI AND COVER

6.2 Metal handles shall be fitted to the utensils by spot welding or riveting. Spot welded joints shall not have any crevices. In case of plastic handles, it shall be suitably fitted to the body through a metal bracket or ferrule fixed to the utensil by spot welding or riveting.

7 TESTS

7.1 Coating Thickness Test

The total thickness of the utensil including copper deposit shall be measured. The copper deposit shall then be stripped off in two areas of required size. The thickness of the stainless steel sheet shall then be



All dimensions in millimetres.

FIG. 2 DEEP DEGCHI

measured. The difference between the total thickness including copper deposited and the thickness of stainless steel sheet shall be considered as the thickness of the copper deposited. This test is for electro-deposition of copper only.

7.2 Adhesion Test

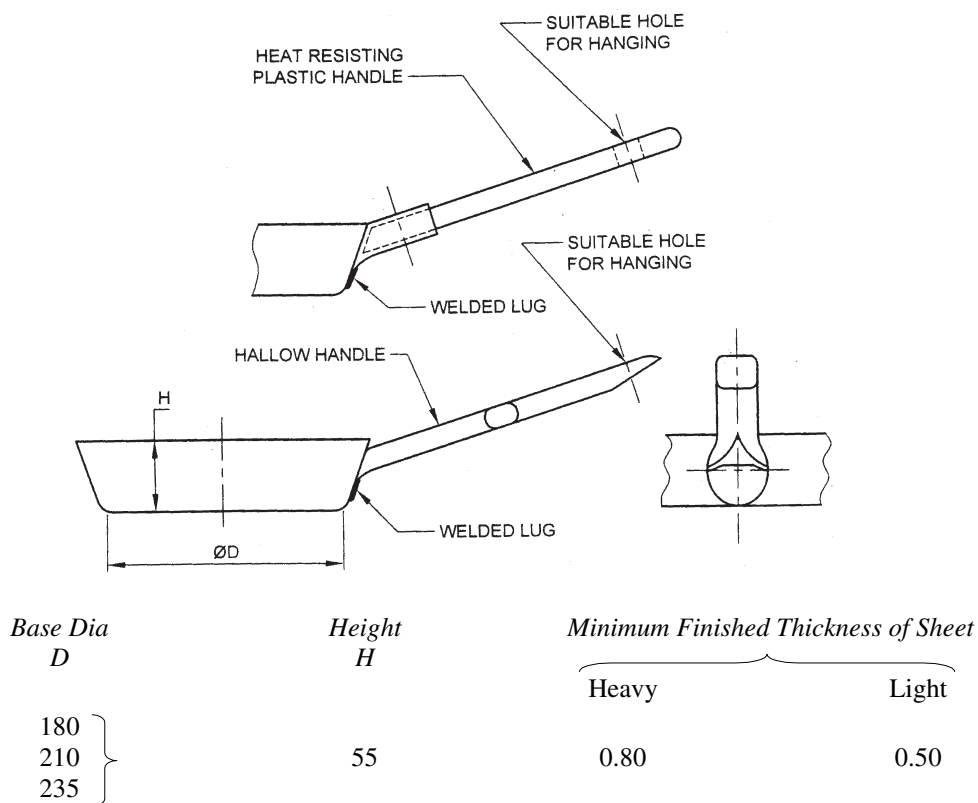
The utensil shall be subjected to the adhesion tests as specified in 7.2.1, 7.2.2 and 7.2.3.

7.2.1 Mechanical Shock Test

The utensil body only in question shall be supported in air with the bottom side up and a steel ball weighing 500 g dropped on to it from a height of 250 mm, five times. After completion of the test, the cladded or deposited layer shall show no sign of peeling off or coming off.

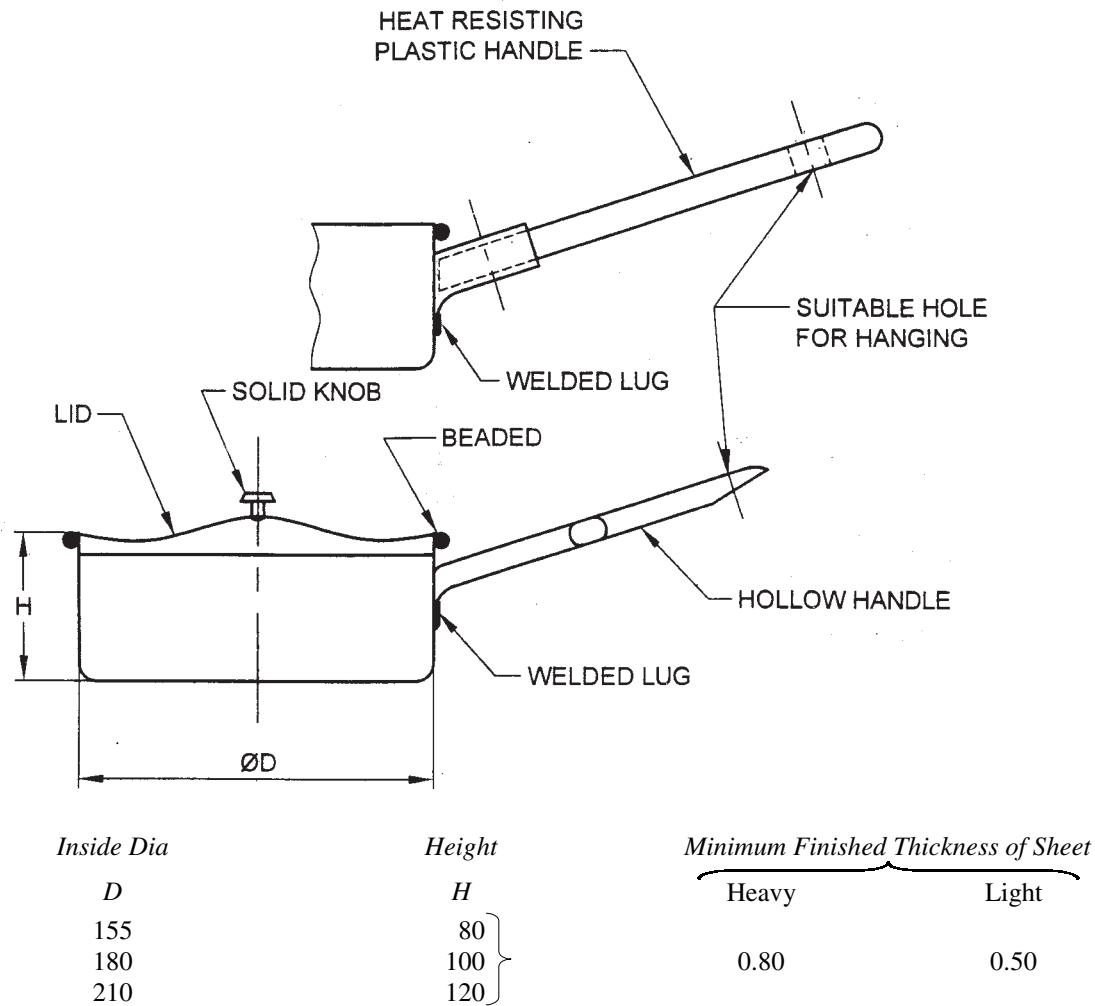
7.2.2 Thermal Shock Test

The utensil body only shall be kept in an oven to attain a of $275 \pm 25^\circ\text{C}$. Thereafter utensil shall be removed and dipped immediately in water maintained at room temperature (ambient temperature). This process shall be repeated three times and at the end of the process the deposit shall not show any sign of peeling off or coming off. This test is applicable only for electro-deposited utensils.



All dimensions in millimetres.

FIG. 3 FRYING-PAN



All dimensions in millimetres.

FIG. 4 SAUCE PAN

7.2.3 Dry Heat Test

The utensil body is heated upto $450 \pm 20^{\circ}\text{C}$ and immediately quench in water (water temperature before quenching should be around $35 \pm 5^{\circ}\text{C}$). Repeat the cycle 25 times. Check the bottom for bulge, separation of disc or blisters after cooling every cycle. There shall be no separation of cowl or disc from the utensils after cooling. This test is applicable only for clad 2-ply and 3-ply construction utensils.

7.3 Staining Test

The utensils body, when dipped for 16 h in each of the following solutions shall not show any sign of staining on the surfaces intended to come in contact with food after removal from the solutions:

- a) 10 g of glacial acetic acid (99 percent) dissolved in distilled water to make 100 ml, and

- b) 5 g of pure sodium chloride dissolved in distilled water to make 100 ml.

8 SAMPLING

Unless otherwise agreed to between the purchaser and the manufacturer the sampling plan and the criterion for conformity given in IS 9040 shall be followed. To ensure the quality of the utensils additional tests shall be conducted on three utensils selected at random from one shift production or 100 pieces, whichever is less in the order specified in the Table 5.

9 PACKING

The utensils shall be wrapped in soft tissue paper or plastic bags and packed in accordance with best trade practice or according to the instructions of the purchaser. Care shall be taken to ensure that the utensils do not get damaged during transit.

Table 5 Addition Tests
(Clause 8)

Sl No. (1)	Tests (2)	Remarks (3)
i)	Sample 1:	
	a) Mechanical shock test (see 7.2.1)	If found OK subject to next test
	b) Thermal shock test (see 7.2.2)	Only for electrodeposited utensils
ii)	Sample 2:	
	Staining test (see 7.3)	This test is to be carried out for every 5 000 pieces or once in a month whichever is earlier
iii)	Sample 3:	
	Dry heat test (see 7.2.3)	For clad 2-ply and 3-ply construction utensils

10 MARKING

10.1 Each utensil shall be indelibly marked with the

manufacturer's name, registered trade-mark or identification mark. The utensils shall also be marked indicating the capacity in litre or size, in mm. The impression of the marking shall not show up on the inside.

10.2 BIS Certification Marking

The utensil may also be marked with BIS Standard Mark.

10.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Utensils, Cutlery and Domestic Hardware Sectional Committee, MED 33

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Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002

Telephones : 2323 0131, 2323 3375, 2323 9402

Website: www.bis.org.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160022	{ 60 3843 60 9285
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
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